2 does not depend for antecedent basis from claim 1. As such, there is no indefiniteness presented by Applicants' claims as instantly amended. For completeness, it is also noted that the instant amendment to claim 1 does not narrow the scope of the claim, but simply in a more particular fashion sets forth the inventive discovery which Applicants have invented and have set forth in the claims.

Claim Rejections Under 35 USC § 103

Claims 1-3 have been rejected under 35 USC § 103(a) over Ashmead (US 4,172,072). Reconsideration and withdrawal of this rejection is requested based upon the following considerations.

U.S. Pat. No. 4,172,072 to Harvey H. Ashmead discloses a method of preparing buffered metal proteinates using a mixture of tripeptides, dipeptides and amino acids, which are produced by hydrolysis of a protein source by action of a specific protease. However, the present invention is characterized in that Oligopeptides are produced when a protein source is enzymatically hydrolyzed with an enzyme.

Protease in a human body can degrade proteins to the level Oligopeptides, while not producing tripeptides, dipetides or amino acids. The present invention uses protease enzyme derived from animals to degrade protein sources. In contrast, the '072 patent uses an enzyme from plants.

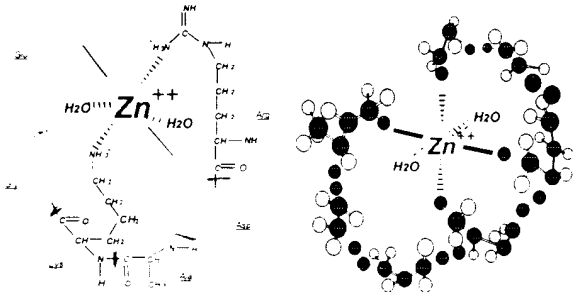
Effective chelating of a bivalent metal requires an Oligopeptide consisting of 8 or more amino acids linearly connected by peptide bonds, which should have a molecular length sufficient for dissolution in water. A peptide molecule consisting of less than three amino acids, which are linearly connected by peptide bonding, cannot chelate a bivalent metal owing to its short length. In addition, since a peptide molecule consisting of at least 2 acidic amino acids and at least 2 basic amino acids is required for chelating bivalent metals, a peptide molecule for chelating a bivalent metal should comprise 4 or more amino acids. Therefore, it is most ideal that a peptide molecule for chelating a divalent metal is an Oligopeptide consisting of 8 amino acids, which can bend and thus surround the divalent metal. That is, a peptide consisting of less than 3 amino acids cannot chelate a divalent metal. The present invention is different in that the resulting substance is a chelated substance, not an aminate as disclosed in the '072 patent.

The chelated compound, used in the present invention, refers to a surrounded state of a metal ion by a water-soluble protein, an Oligopeptide, and means a substance not ionized in an aqueous solution.

The aminate compound in which amino acids cannot surround a metal ion is ionized in an aqueous solution and thus dissociated into a metal ion and amino acids, which display their unique

properties. The aminate compound is a salt formed by reaction of one amino acid with a monovalent metal ion, or reactivity of two amino acids with a divalent metal ion, thus exposing the metal ion to water environment while increasing its reaction with substances in an aqueous solution, and leading to its easy ionization in an aqueous solution. In contrast, the chelated construct according to the present invention is not ionized in an aqueous solution because an Oligopeptide, which consists of at least 6 to 10 amino acids linearly connected by peptide bonding, completely surrounds a metal ion.

As shown in the Structural Formula, below, in which a zinc ion is chelated by an Oligopeptide consisting of 6 amino acids, since the Oligopeptide completely surrounds the zinc ion, the zinc ion does not display an independent behavior.

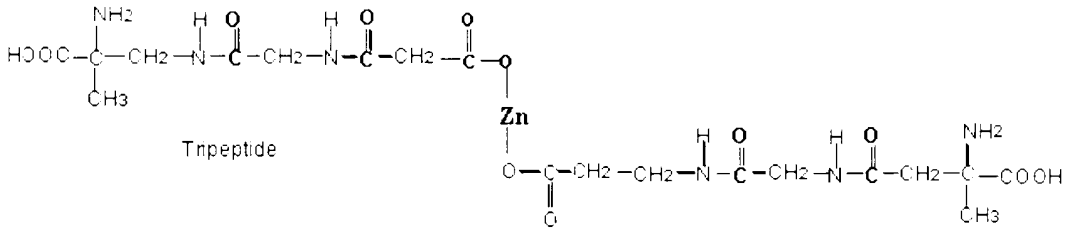


Zinc Oligopeptide

The Structural Formula (A), below, shows an example of a zinc hexa aminate, and the Reaction Scheme (B) shows a mechanism to form a zinc aminate through reaction of amino acids with a zinc ion, in

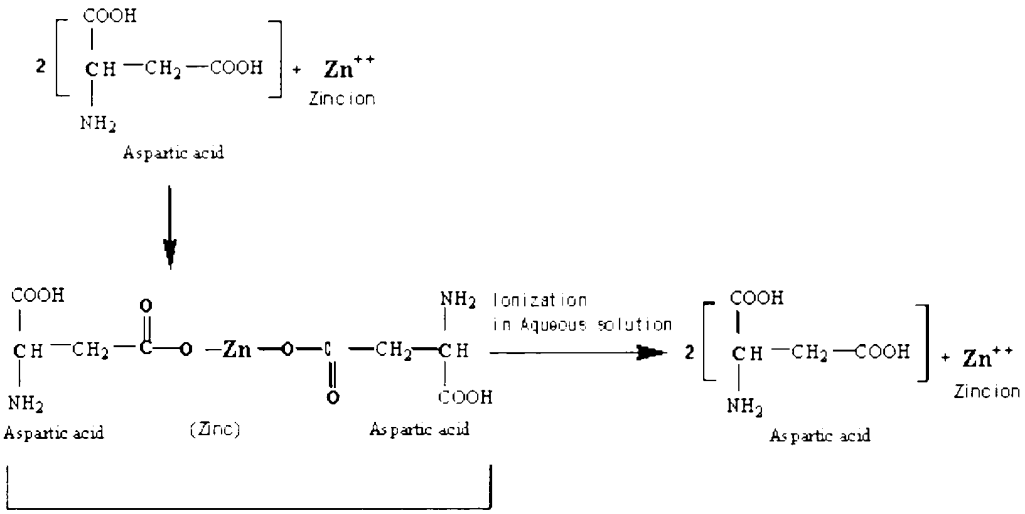
which the aminate is ionized in an aqueous solution and then separated into amino acids and the zinc ion, after which the zinc ion will display its own properties.

(A)



Zinc Hexa aminate
(Zinc Di-tripeptide)

(B)



Zinc diaminate

Ionization in Aqueous solution

Compounds not exposing a zinc ion, such as the chelated compound, do not coagulate with or accrete in mucous membranes of the small intestine, in which metal ions are absorbed, thus

facilitating their absorbance into the body. However, the aminate compounds are easily ionized in an aqueous solution owing to exposure of zinc ions, and thus coagulating with or accreting in mucus or mucous membranes of the small intestine while not being absorbed into the body. Also, to be absorbed into the body, a metal ion should pass through an integral protein in the small intestinal wall. Therefore, free metal ions produced by ionization of the aminate compounds of the '072 patent do not easily pass through the integral protein owing to their charge, while coagulating with or accreting in the integral protein, thus preventing absorbance of metal ions into the body.

Accordingly, based upon the above considerations, it is clear that the instantly claimed invention (claims 1-3) are in no way anticipated or rendered obvious by the cited reference of Ashmead (US '072). In this respect, Ashmead provides no teaching, disclosure or motivation which would allow one of ordinary skill in the art to arrive at the instant invention as claimed.

CONCLUSION

Based upon the amendments and remarks presented herein, the Examiner is respectfully requested to issue a Notice of Allowance, clearly indicating that each of the pending claims 1-3 are allowed and patentable under the provisions of Title 35 of the United States Code.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact John W. Bailey (Reg. No. 32,881) at the telephone number below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

Attached hereto is a marked-up version of the changes made to the application by this Amendment.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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By _____
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JWB/end
0655-0114P

Attachment: Version with Markings to Show Changes Made

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

The claims have been amended as follows:

2. (Thrice Amended) [The method as set forth in claim 1, wherein:] A method of preparing a zinc-oligopeptide easily absorbable by the body, comprising the steps of:

[the] preparing a suspension of protein [is prepared] by suspending 100 parts by weight of protein in 800 parts by weight of deionized water,

proteolyzing the protein suspension [is proteolyzed] at pH 3.5-6.0 for 10-12 hours in deionized water in the presence of 2-4 parts by weight of protease to give [the] a mixture of oligopeptides,

chelating zinc ions [are mixed] with the mixture of oligopeptides in a weight ratio of zinc/oligopeptides of 1/1,000 [and allowed to chelate,] to yield [the] a zinc-oligopeptide solution, and

[the] concentrating the zinc-oligopeptide solution [is concentrated] to a solid content of 32-36% and [dried] drying to produce [the] a zinc-oligopeptide powder.